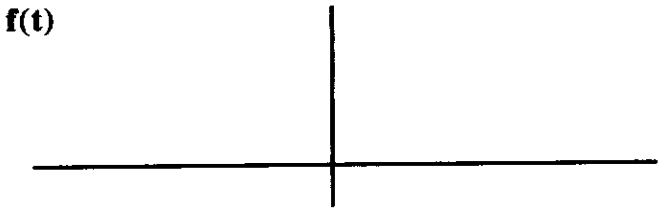
The FTC (One More Time)

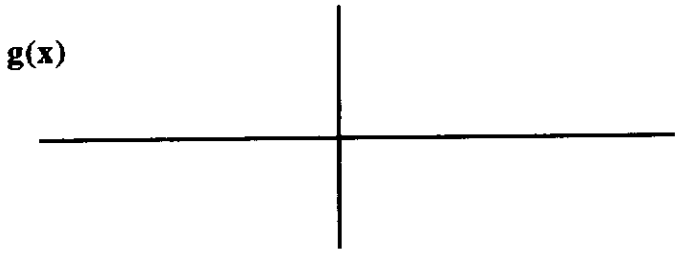
Let a continuous and differentiable function $y = f(t)$ contain the following ordered pairs:

t	-4	-3	-2	-1	0	1	2	3	4
f(t)	0.06	0.1	0.2	0.5	1	0.5	0.2	0.1	0.06

Make a **scatterplot** of the data, with t values in L1 and f(t) values in L2. Also sketch the points and connect them to show $y = f(t)$ below. (Remember f(t) is differentiable.)



If $g(x) = \int_0^x f(t)\,dt$, without your calculator sketch g(x) below.



Where is g(x) concave up? _____ What is true about f(t) on this interval? _____

Where is g(x) concave down? _____ What is true about f(t) on this interval? _____

There are no maximum or minimum values on the graph of g(x). Using the graph of $y = f(t)$, explain why this is true. _____

Does it appear g(x) has horizontal asymptotes? _____

g(x) is a function that we know! Can you find it? Make a guess of g(x). $g(x) =$ _____

It is hard to tell if your guess for g(x) is correct, but, if it is, what would g'(x) be? $g'(x) =$ _____

If g(x) was correct, the graph of g'(x) should go through the points you originally graphed in your scatterplot. Try it.

This means that $f(t) =$ _____.

Recall that one part of the Fundamental Theorem of Calculus says that: $\frac{d}{dx}\int_a^x f(t)dt = f(x)$

Complete **the Fundamental Theorem of Calculus** using the appropriate functions in this problem.

$$\frac{d}{dx}\int_a^x \_\_\_\_\_\, dt = \_\_\_\_\_$$

What is $g'(-3)$? _____ $g'(2)$? _____ These values can be found two different ways.

Explain.

1. _____

2. _____